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CLAIMS

[Claim(s)]

[Claim 1] While preparing the connection section for power transfer connected with the input-shaft flank material connected with the rotation driving source, and this input-shaft flank material and the output-shaft flank material located on the same axle with the play in a predetermined include angle The wedge-shaped space section which allows a bite lump and ranging behavior of a lock member is formed between the inner skin of a ring object and the peripheral faces of output-shaft flank material which are fixed to rotation impossible to the body of a tool, and surround the above-mentioned output-shaft flank material. The projection which projects in the direction of a path in which the release member which extrudes the above-mentioned lock member to the ranging behavior field side in the wedge-shaped space section was formed in input-shaft flank material, and the connection section was prepared in output-shaft flank material. The wedge-shaped space section in which it became from the projection which served as the release member which projects in the shaft orientations prepared in input-shaft flank material, and the lock member was arranged It is prepared, respectively between the projection in output-shaft flank material, and the projection of the input-shaft flank material arranged at the both sides of this projection, respectively. Both the wedge shape space section currently formed by the peripheral face of output-shaft flank material inclining in the direction of a core of output-shaft flank material toward a projection while being located in the both sides of a projection of output-shaft flank material The rotation tool characterized by for the above-mentioned inclination direction conflicting mutually, and for the side to which both projection approach separates from a ranging behavior field and a projection biting, having become a lump field, and the lock member matched for the object for a normal rotation lock and another side with the lock member allotted to one side of both this wedge shape space section having become an inversion lock.

[Claim 2] the rotation tool according to claim 1 characterize by for the wedge-shaped space section from which rotation immobilization be carry out with a clutch spring elastically [the internal gear in this planet moderation device which can be idle] , and the inclination direction differ between an output shaft flank material and a ring object to be prepare , and to be allot to each wedge-shaped space section the lock member for a normal rotation lock , and the lock member for an inversion lock while the planet moderation device be allot to the input shaft side

[Claim 3] The rotation tool according to claim 1 characterized by forming a ring object with non-magnetic material, and forming a lock member and output-shaft flank material by the member to which the magnetic-attraction force acts mutually.

[Claim 4] It is the rotation tool according to claim 1 characterized by for the output-shaft flank material equipped with the projection being the plate fixed to the output shaft, and the elastic body part having projected at least one side of this plate and a ring object outside rather than the rigid-body part while it is formed as laminated material of the rigid body and an elastic body.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[Industrial Application]

This invention relates to a rotation tool like an electric driver or an electric wrench, and the rotation tool in which the automatically locking of an output shaft and the Ohtori lease are especially possible.

[Description of the Prior Art]

In a rotation tool like an electric driver or an electric wrench, since auxiliary bolting when enabling use as a preparation type and not having been closed by bolting or electromotive force by the feeling of a hand can be performed by hand-clapping, the thing of an output shaft for which it can be made to carry out the rotation lock is very useful. And in giving such a lock function, it is desirable on user-friendliness that the Ohtori lease by which discharge of a lock will be automatically made if a motor is rotated when it is in a lock condition, and the automatically locking which will apply a lock automatically if a motor is stopped are made. Although the thing of various gestalten is proposed from before, the thing equipped with such automatically locking and the Ohtori lease function What performs automatically locking and Ohtori lease as what was constituted mechanically by transmitting the on-off operation of a switch handle even to a lock part mechanically, It is divided roughly into what performs discharge of the lock by the ratchet pawl, and this lock using a motion of the internal gear of an epicyclic gear drive as JP,62-287979,A etc. is shown.

[Problem(s) to be Solved by the Invention]

However, the member for operating mechanically the lock member allotted to the lock part located in the place left by actuation of a switch handle by remote control is required, structure tends to become complicated, and regulation arises in the arrangement location of a switch, or the former has problems — it is hard to collect into a compact.

While the switching noise of a ratchet pawl occurring or being hard to take the reinforcement of the member which supports a ratchet pawl, in the case of the latter, a member configuration is surely complicated, and it has the problem used as a cost rise in it.

What [what was shown in JP,47-49360,B], i.e., the inner board fixed to the body of a rotation tool, The flywheel of the shape of a cylinder which is connected with a motor shaft and a driver shaft, and surrounds the periphery of the inner board, Having the lock member of the shape of koro arranged between the wedge-shaped notches and flywheel inner skin which were formed in the inner board periphery, and a lock member sliding freely in the large ranging behavior field in a wedge-shaped notch at the time of rotation of a motor If it is made to rotate with the body of a rotation tool where it carried out the rotation drive of the driver shaft through the flywheel from the inner board and a motor is stopped So that it may rotate at one in the same direction as the direction to which the inner board of the body of a tool and one rotates to a flywheel, and a lock member enters into the constriction section with a wedge-shaped narrow notch, consequently a lock member carries out a pressure welding to the inner skin of a flywheel, and a flywheel turns the body of a tool That is, although there is also a thing which will be in the condition that the driver shaft was locked to the body of a tool, and enabled it to perform hand-clapping Since it is that by which only rotation of an one direction is permitted also when carrying out a rotation drive by the motor, and also when making it rotate manually although it has both the functions of automatically locking and the Ohtori lease in this thing *** loosens only bolting of a screw thread, and it can use only an activity, but is very inconvenient on real use.

In view of such a point, it succeeds in this invention, and the place made into the purpose is to offer a reliable electric driver or a rotation tool like an electric wrench while being able to perform automatically locking about both hands of cut, and Ohtori lease with easy structure.

[Means for Solving the Problem]

carrying out a deer, this invention prepares the connection section for power transfer connected with the input-shaft flank material connected with the rotation driving source, and this input-shaft flank material and the output-shaft flank material located on the same axle with the play in a predetermined include angle — both The wedge-shaped space section which allows a bite lump and ranging behavior of a lock member is formed between the inner skin of a ring object and the peripheral faces of output-shaft flank material which are fixed to rotation impossible to the body of a tool, and surround the above-mentioned output-shaft flank material. The projection which projects in the direction of a path in which the release member which extrudes the above-mentioned lock member to the ranging behavior field side in the wedge-shaped space section was formed in input-shaft flank material, and the connection section was prepared in output-shaft flank material, The wedge-shaped space section in which it became from the projection which served as the release member which projects in the shaft orientations prepared in input-shaft flank material, and the lock member was arranged It is prepared, respectively between the projection in output-shaft flank material, and the projection of the input-shaft flank material arranged at the both sides of this projection, respectively. Both the wedge shape space section currently formed by the peripheral face of output-shaft flank material inclining in the direction of a core of output-shaft flank material toward a projection while being located in the both sides of a projection of output-shaft flank material The above-mentioned inclination direction conflicts mutually, the side to which both projection approach separates from a ranging behavior field and a projection bites, and it has become a lump field. It has the main description for the lock member matched for the object for a normal rotation lock and another side with the lock member allotted to one side of both this wedge shape space section to have become an inversion lock.

[Function]

According to this invention, by the wedge-shaped space section which allows a bite lump and ranging behavior of a lock member and this lock member automatically locking And since it is formed by two parts with the inclination where the Ohtori lease is

possible and the wedge-shaped space section moreover changes with release members prepared in input-shaft flank material. Automatically locking and Ohtori lease can be performed about both hands of cut of both, and it is still easier to be simple [formation of these each part material].

[Example]

The solar gear 31 which fixed to the output shaft 20 of a motor 2 when it explained in full detail based on the example of illustration of this invention below, The planet device which consists of an internal gear 33 fixed to gear case 6 inside and a carrier 34 equipped with two or more planet gears 32 which mesh to these both, and the shaft 35 which supports each planet gear 32 is established as a moderation means. The carrier 34 in this planet device and the output shaft 7 equipped with the chuck 8 are put in order by shaft orientations on the same axle. The sliding bearing in which six in drawing receives a gear case, and 61 receives an output shaft, and 62 are the shots and retainers from which a thrust plate and 63 constitute the snap ring and 64, 65, and 66 constitute a thrust bearing.

from the edge outside peripheral surface by the side of the carrier 34 of the above-mentioned output shaft 7, it is shown in Fig. 2 — as — the projection 70 of two or more — a radial — and it protrudes at equal intervals. Moreover, in the inside of a gear case 6, the ring object 51 surrounding the periphery of the above-mentioned projection 70 has fixed. And two or more projections 36 which project to shaft orientations and are located in the space between the inner skin of the ring object 51 and the peripheral face of an output shaft 7 are formed in the end face of a carrier 34. The connection section for rotational motion force transfer to which projection 36 and projection 70 set spacing, and he is trying to locate them in a line, and they have the play of a predetermined include angle in a hoop direction in a hand of cut by these the projections 36 and 70 of both is formed so that these projections 36 may be located between each projection 70 of an output shaft 7 while the thing of the above-mentioned projection 70 and the same number is formed at equal intervals in the hoop direction that is..

In here, the peripheral face of the both sides of the projection 70 in an output shaft 7 Since the projection 70 side serves as the inclined plane 71 which becomes low, respectively, the wedge-shaped space section is formed in the both sides of projection 70 between the above-mentioned peripheral face and the inner skin of the ring object 51. And the roller-like lock members 50a and 50b are arranged in these wedge shape space section that are the both sides of projection 70 and is prepared between the projection 36 of a carrier 34, and the projection 70, respectively, respectively, and the lock means 5 is formed in it. In addition, the object for the lock of one direction rotation and lock member 50b of lock member 50a are the objects for the lock of the other directions rotation. The diameter of these lock members 50a and 50b is smaller than the height of the part by the side of the projection 70 of the wedge-shaped space section, and since it is larger than the height of the part by the side of projection 36, although the lock members 50a and 50b are in a ranging behavior condition when located in a projection 70 side, if they separate from projection 70, they are bit between output-shaft 7 peripheral face and ring object 51 inner skin, and lock an output shaft 7.

Fig. 6 shows the appearance and, as for a switch handle and 12, the bit in which the body was equipped with one in drawing and the chuck 8 was equipped with 9, and 11 are [a hand-of-cut change-over handle and 13] power packs.

Next, actuation is explained. Now, if a motor 2 is rotated, this output is slowed down in a planet device and serves as rotation of a carrier 34, and the projection 36 of a carrier 34 will press the projection 70 of an output shaft 7 through lock member 50b, as shown in Fig. 2, and will rotate an output shaft 7. The inside of the lock members 50a and 50b of the pair located in the wedge-shaped space section of projection 70 both sides at this time, A ranging behavior field [in / by pushing lock member 50b by projection 36 / the wedge-shaped space section], That is, it is located in the part of projection 70 approach, lock member 50a is not located in the ranging behavior field in the wedge-shaped space section according to that inertia, and the lock members 50a and 50b do not bar [for this reason] rotation of an output shaft 7.

Especially projection 70 and projection 36 here from considering as the abbreviation sector to which the width of face by the side of a periphery is larger than the difference which this difference produces in the difference in a radius location more widely than the width of face by the side of inner circumference. Projections 36 and 70 generate the force which forces on the peripheral face of an output shaft 7 the lock members 50a and 50b which are all rollers-like, and do not cause the loss of the force by the lock members 50a and 50b touching the inner skin of the ring object 51. While forming the ring object 51 with non-magnetic material, as a magnetic suction force commits the lock members 50a and 50b and an output shaft 7 among both, you may carry out as [prevent / by the magnetic-attraction force / contact on the lock members 50a and 50b and the ring object 51].

When the hand of cut of a motor 2 is reverse, as shown in Fig. 3, since it is located in a ranging behavior field [in / respectively / time / this / projection 36 transmits power to an output shaft 7 through lock member 50a and projection 70 rotates an output shaft 7, and / in both the lock members 50a and 50b / the wedge-shaped space section] side, the shape of a lock is not made.

It is the relative rotation produced between the ring object 51 and an output shaft 7. and — if a body 1 is rotated in the direction of bolting to the circumference of the shaft of an output shaft 7 in order to perform bolting by hand control, where a motor 2 is stopped — a body 1 — getting it blocked — Although lock member 50b maintains a condition [having been located in the ranging behavior field of projection 70 approach], lock member 50a separates from projection 70 by the rolling motion accompanying the above-mentioned relative rotation, and as shown in Fig. 4, in order [in the wedge-shaped space section] to bite and to move to a lump part side, the ring object 51 and an output shaft 7 are unified. That is, the free rotation of an output shaft 7 will be in the condition of it being locked by lock member 50a and rotating with a body 1, and hand-clapping of a screw or a nut of it will become possible. And the shift to this lock condition is made automatically as mentioned above.

In order to loosen a screw and a nut, when a body 1 is turned to hard flow, as shown in Fig. 5, lock member 50b locks an output shaft 7, and makes hand return possible.

And if a motor 2 is again rotated in the condition of having been locked in this way In order to return the lock members 50a and 50b which the direction of projection 70 approached the lock members 50a and 50b by rotation of an output shaft 7, bit for the lock, and were in the lump location to the ranging behavior field in the wedge-shaped space section Or in order to put back the lock members 50a and 50b which the projection 36 in a carrier 34 bites and are in a lump location to the ranging behavior field side of the wedge-shaped space section, discharge of a lock is made automatically. Projection 36 also serves as a release member and can obtain the cost cut by reduction of the number of components while it is a power transfer member.

Other examples are shown in Figs. 7 - 10. This differs from what was shown in the above-mentioned example in that the clutch for adjustment of bolting torque is incorporated, although the structure for automatically locking and the Ohtori lease is the same.

That is, while rotation of an internal gear 33 is enabled here at the circumference of a shaft, the toothing-like clutch side 37 is established in the front and side of Intal Gear's 33 shaft orientations. And the hole 62 of shaft orientations is formed in

case 6, and the shot 74 which engages with the above-mentioned clutch side 37 is arranged in this hole 62. Moreover, the clutch plate 77, and the clutch spring 76 and the thrust plate 75 are arranged in the periphery of the front end side of a gear case 6, and the clutch plate 77 is engaging with the stair-like projection 80 formed in the inside of the clutch handle 78 arranged by the point of a body 1 free [rotation]. 79 in drawing is the attachment plate of the clutch handle 78.

The above-mentioned clutch spring 76 pressed the shot 74 through the thrust plate 75, carried out the load of the spring load to the engagement section of a shot 74 and the clutch side 37, and has stopped rotation of an internal gear 33. Since the engagement condition of an internal gear 33 and a shot 74 is maintained and rotation of an internal gear 33 is stopped when load torque required to rotate a screw and a nut is small, rotation of a motor 2 is slowed down like the case of said example, and is told to an output-shaft 7 side. However, if load torque becomes large rather than the setting torque by the above-mentioned spring load, rotation is begun an internal gear 33 resisting the clutch spring 76, and pushing back a shot 74 in respect of [37] a clutch, and since the power transfer by the side of an output shaft 7 will be intercepted by the slip of this internal gear 33, the bolting torque of a screw or a nut will be restricted to setting torque.

If the clutch handle 78 is rotated, in order that the clutch plate 77 and engagement location where the stair-like projection 80 of clutch handle 78 inside and rotation of the circumference of a shaft are stopped change, a clutch plate 77 may move to shaft orientations and the amount of compression of the clutch spring 76 may change, the above-mentioned setting torque can be adjusted.

Although it is in the condition that the lock was canceled as well as the condition which showed in Figs. 2 or 3 when it binds tight in here because an internal gear 33 begins a slip as mentioned above, and a limit of torque is made If body 1 itself is turned in the direction of thread fastening as [this], i.e., with the condition of having made the motor 2 turning on, as shown in Fig. 9 by rotation of a body 1, i.e., rotation of the ring object 51 Till then, it is free, and since lock member 50a which was in the ranging behavior field of the wedge-shaped space section bites, it moves to a lump location and an output shaft 7 is locked, it can shift to a hand-clapping activity as it is.

And if a body 1 is turned to hard flow, while being in the condition that the lock by lock member 50a was canceled, as [show / in Fig. 10] succeeding with the condition of having made the motor 2 turning on Although lock member 50b shifts to a lock location at this time properly speaking Since the projection 36 of a carrier 34 is pushing lock member 50b on the projection 70 side by counteraction of a slip of an internal gear 33 at this time as the drawing Nakaya mark shows, it does not shift to a lock condition, and the automatically locking about this inverse rotation does not work. For this reason, hand-clapping with the condition of having operated the switch handle 11 and having operated the motor 2 can be performed as ratchet bolting like a ratchet driver or a ratchet wrench.

Other examples are shown in Figs. 11 thru/or 13. This equips with the plate 80 which consists of the rigid body of two sheets, and the plate 81 which consists of an elastic body of one sheet, and forms projection 70 on these plates 80 and 81 two or more sheets equipped with the hole which fits into this variant cross-section section, and here while it prepares the variant cross-section section in the back end section of an output shaft 7. The outer diameter except the overall diameter of the plate 81 which consists of an elastic body especially here is made somewhat larger than the plate 80 which consists of the rigid body of two sheets which has sandwiched this. As the plate 81 with which the lock members 50a and 50b consist of an elastic body is contacted, it enables it to obtain a positive lock.

Clearance c is formed between the variant cross-section section of an output shaft 7, and the fitting hole 84 in the plate 83 equipped with the projection 70, and you may enable it to obtain a positive lock using shakiness by this clearance c, as shown in Fig. 14. In this case, while stopping needing precision for pin center, large doubling of a sliding bearing 61 and the ring object 51 so much, assembly nature also improves.

Another example is shown in Figs. 15 - 17. While this makes the end of the shaft 35 in a carrier 34 project from the end face of a carrier 34 to an output-shaft 7 side, the end of the lock members 50a and 50b is made to project to a carrier 34 side rather than the end face of an output shaft 7, and it is made for the contact to both the lock members 50a and 50b of the shaft 35 located among a pair of lock members 50a and 50b in a hand of cut to be attained.

In this case, even if grease adhered to the lock members 50a and 50b currently formed in the shape of a roller and the lock members 50a and 50b have adhered to the both-sides side of projection 70 on the viscosity of grease When performing hand fastening by hand control by turning a body 1 Since the shaft 35 in the carrier 34 which turns to an output shaft 7 with a body 1 pulls away from projection 70 by pushing this in contact with lock member 50a as shown in Fig. 16 When the thing in the wedge-shaped space section which it bites and is moved to a lump location is not barred, a lock is made certainly and a body 1 is turned [and] to hard flow, lock member 50a Since a shaft 35 pushes lock member 50b and pulls away from projection 70 as shown in Fig. 17, the lock of the output shaft 7 also according [this time] to lock member 50b is made certainly.

Even if the grease with which the part of a planet device is filled up has adhered to the lock members 50a and 50b It is the reason that whose the situation where the lock members 50a and 50b will become having adhered to as at the projection 70, and the lock function of an output shaft 7 will be spoiled is caused it is lost. Conversely, it is also possible to arrange grease on the arrangement section of the lock members 50a and 50b, and to aim at reduction of a sound.

In addition, although the shaft 35 which is supporting the planet gear 32 here is used, heights are separately prepared in the end face of a carrier 34, and you may make it these heights contact the lock members 50a and 50b.

[Effect of the Invention]

In this invention, the lock of the output shaft by a lock member biting in the wedge-shaped space section formed between the peripheral face of output-shaft flank material and the inner skin of the ring object which cannot be rotated as mentioned above It is what is automatically made according to relative rotation with output-shaft flank material and a ring object. It is that by which the Ohtori lease is also made by the release member which has turned to automatically locking up and was prepared in the rotation in within the limits and the input-shaft flank material of the play of the input-shaft flank material to output-shaft flank material. And the wedge-shaped space section is prepared, respectively between the projection in the output-shaft flank material which constitutes the connection section, and the projection which served as the release member of the input-shaft flank material arranged at the both sides of this projection, respectively. Since the lock member matched for the object for a normal rotation lock and another side with the lock member allotted to one side of both the wedge shape space section with the inclination direction which conflicts mutually has become an inversion lock Automatically locking and the Ohtori lease work about both hands of cut, user-friendliness is very good as this therefore an electric driver, or a rotation tool like an electric wrench, moreover, it is easy to be simple [the configuration of these each part material], and it is reliable.

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TECHNICAL FIELD

[Industrial Application]

This invention relates to a rotation tool like an electric driver or an electric wrench, and the rotation tool in which the automatically locking of an output shaft and the Ohtori lease are especially possible.

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PRIOR ART

[Description of the Prior Art]

In a rotation tool like an electric driver or an electric wrench, since auxiliary bolting when enabling use as a preparation type and not having been closed by bolting or electromotive force by the feeling of a hand can be performed by hand-clapping, the thing of an output shaft for which it can be made to carry out the rotation lock is very useful. And in giving such a lock function, it is desirable on user-friendliness that the Ohtori lease by which discharge of a lock will be automatically made if a motor is rotated when it is in a lock condition, and the automatically locking which will apply a lock automatically if a motor is stopped are made. Although the thing of various gestalten is proposed from before, the thing equipped with such automatically locking and the Ohtori lease function What performs automatically locking and Ohtori lease as what was constituted mechanically by transmitting the on-off operation of a switch handle even to a lock part mechanically, It is divided roughly into what performs discharge of the lock by the ratchet pawl, and this lock using a motion of the internal gear of an epicyclic gear drive as JP,62-287979,A etc. is shown.

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EFFECT OF THE INVENTION

[Effect of the Invention]

In this invention, the lock of the output shaft by a lock member biting in the wedge-shaped space section formed between the peripheral face of output-shaft flank material and the inner skin of the ring object which cannot be rotated as mentioned above It is what is automatically made according to relative rotation with output-shaft flank material and a ring object. It is that by which the Ohtori lease is also made by the release member which has turned to automatically locking up and was prepared in the rotation in within the limits and the input-shaft flank material of the play of the input-shaft flank material to output-shaft flank material. And the wedge-shaped space section is prepared, respectively between the projection in the output-shaft flank material which constitutes the connection section, and the projection which served as the release member of the input-shaft flank material arranged at the both sides of this projection, respectively. Since the lock member matched for the object for a normal rotation lock and another side with the lock member allotted to one side of both the wedge shape space section with the inclination direction which conflicts mutually has become an inversion lock Automatically locking and the Ohtori lease work about both hands of cut, user-friendliness is very good as this therefore an electric driver, or a rotation tool like an electric wrench, moreover, it is easy to be simple [the configuration of these each part material], and it is reliable.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]

However, the member for operating mechanically the lock member allotted to the lock part located in the place left by actuation of a switch handle by remote control is required, structure tends to become complicated, and regulation arises in the arrangement location of a switch, or the former has problems — it is hard to collect into a compact. While the switching noise of a ratchet pawl occurring or being hard to take the reinforcement of the member which supports a ratchet pawl, in the case of the latter, a member configuration is surely complicated, and it has the problem used as a cost rise in it.

What [what was shown in JP,47-49360,B], i.e., the inner board fixed to the body of a rotation tool, The flywheel of the shape of a cylinder which is connected with a motor shaft and a driver shaft, and surrounds the periphery of the inner board, Having the lock member of the shape of koro arranged between the wedge-shaped notches and flywheel inner skin which were formed in the inner board periphery, and a lock member sliding freely in the large ranging behavior field in a wedge-shaped notch at the time of rotation of a motor If it is made to rotate with the body of a rotation tool where it carried out the rotation drive of the driver shaft through the flywheel from the inner board and a motor is stopped So that it may rotate at one in the same direction as the direction to which the inner board of the body of a tool and one rotates to a flywheel, and a lock member enters into the constriction section with a wedge-shaped narrow notch, consequently a lock member carries out a pressure welding to the inner skin of a flywheel, and a flywheel turns the body of a tool That is, although there is also a thing which will be in the condition that the driver shaft was locked to the body of a tool, and enabled it to perform hand-clapping Since it is that by which only rotation of an one direction is permitted also when carrying out a rotation drive by the motor, and also when making it rotate manually although it has both the functions of automatically locking and the Ohtori lease in this thing *** loosens only bolting of a screw thread, and it can use only an activity, but is very inconvenient on real use.

In view of such a point, it succeeds in this invention, and the place made into the purpose is to offer a reliable electric driver or a rotation tool like an electric wrench while being able to perform automatically locking about both hands of cut, and Ohtori lease with easy structure.

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MEANS

[Means for Solving the Problem]

carrying out a deer, this invention prepares the connection section for power transfer connected with the input-shaft flank material connected with the rotation driving source, and this input-shaft flank material and the output-shaft flank material located on the same axle with the play in a predetermined include angle — both The wedge-shaped space section which allows a bite lump and ranging behavior of a lock member is formed between the inner skin of a ring object and the peripheral faces of output-shaft flank material which are fixed to rotation impossible to the body of a tool, and surround the above-mentioned output-shaft flank material. The projection which projects in the direction of a path in which the release member which extrudes the above-mentioned lock member to the ranging behavior field side in the wedge-shaped space section was formed in input-shaft flank material, and the connection section was prepared in output-shaft flank material, The wedge-shaped space section in which it became from the projection which served as the release member which projects in the shaft orientations prepared in input-shaft flank material, and the lock member was arranged It is prepared, respectively between the projection in output-shaft flank material, and the projection of the input-shaft flank material arranged at the both sides of this projection, respectively. Both the wedge shape space section currently formed by the peripheral face of output-shaft flank material inclining in the direction of a core of output-shaft flank material toward a projection while being located in the both sides of a projection of output-shaft flank material The above-mentioned inclination direction conflicts mutually, the side to which both projection approach separates from a ranging behavior field and a projection bites, and it has become a lump field. It has the main description for the lock member matched for the object for a normal rotation lock and another side with the lock member allotted to one side of both this wedge shape space section to have become an inversion lock.

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OPERATION

[Function]

According to this invention, by the wedge-shaped space section which allows a bite lump and ranging behavior of a lock member and this lock member automatically locking And since it is formed by two sorts with the inclination where the Ohtori lease is possible and the wedge-shaped space section moreover changes with release members prepared in input-shaft flank material Automatically locking and Ohtori lease can be performed about both hands of cut of both, and it is still easier to be simple [formation of these each part material].

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EXAMPLE

[Example]

The solar gear 31 which fixed to the output shaft 20 of a motor 2 when it explained in full detail based on the example of illustration of this invention below, The planet device which consists of an internal gear 33 fixed to gear case 6 inside and a carrier 34 equipped with two or more planet gears 32 which mesh to these both, and the shaft 35 which supports each planet gear 32 is established as a moderation means. The carrier 34 in this planet device and the output shaft 7 equipped with the chuck 8 are put in order by shaft orientations on the same axle. The sliding bearing in which six in drawing receives a gear case, and 61 receives an output shaft, and 62 are the shots and retainers from which a thrust plate and 63 constitute the snap ring and 64, 65, and 66 constitute a thrust bearing.

from the edge outside peripheral surface by the side of the carrier 34 of the above-mentioned output shaft 7, it is shown in Fig. 2 — as — the projection 70 of two or more — a radial — and it protrudes at equal intervals. Moreover, in the inside of a gear case 6, the ring object 51 surrounding the periphery of the above-mentioned projection 70 has fixed. And two or more projections 36 which project to shaft orientations and are located in the space between the inner skin of the ring object 51 and the peripheral face of an output shaft 7 are formed in the end face of a carrier 34. The connection section for rotational motion force transfer to which projection 36 and projection 70 set spacing, and he is trying to locate them in a line, and they have the play of a predetermined include angle in a hoop direction in a hand of cut by these the projections 36 and 70 of both is formed so that these projections 36 may be located between each projection 70 of an output shaft 7 while the thing of the above-mentioned projection 70 and the same number is formed at equal intervals in the hoop direction that is.

In here, the peripheral face of the both sides of the projection 70 in an output shaft 7 Since the projection 70 side serves as the inclined plane 71 which becomes low, respectively, the wedge-shaped space section is formed in the both sides of projection 70 between the above-mentioned peripheral face and the inner skin of the ring object 51. And the roller-like lock members 50a and 50b are arranged in these wedge shape space section that are the both sides of projection 70 and is prepared between the projection 36 of a carrier 34, and the projection 70, respectively, respectively, and the lock means 5 is formed in it. In addition, the object for the lock of one direction rotation and lock member 50b of lock member 50a are the objects for the lock of the other directions rotation. The diameter of these lock members 50a and 50b is smaller than the height of the part by the side of the projection 70 of the wedge-shaped space section, and since it is larger than the height of the part by the side of projection 36, although the lock members 50a and 50b are in a ranging behavior condition when located in a projection 70 side, if they separate from projection 70, they are bit between output-shaft 7 peripheral face and ring object 51 inner skin, and lock an output shaft 7.

Fig. 6 shows the appearance and, as for a switch handle and 12, the bit in which the body was equipped with one in drawing and the chuck 8 was equipped with 9, and 11 are [a hand-of-cut change-over handle and 13] power packs.

Next, actuation is explained. Now, if a motor 2 is rotated, this output is slowed down in a planet device and serves as rotation of a carrier 34, and the projection 36 of a carrier 34 will press the projection 70 of an output shaft 7 through lock member 50b, as shown in Fig. 2, and will rotate an output shaft 7. The inside of the lock members 50a and 50b of the pair located in the wedge-shaped space section of projection 70 both sides at this time, A ranging behavior field [in / by pushing lock member 50b by projection 36 / the wedge-shaped space section], That is, it is located in the part of projection 70 approach, lock member 50a is not located in the ranging behavior field in the wedge-shaped space section according to that inertia, and the lock members 50a and 50b do not bar [for this reason] rotation of an output shaft 7.

Especially projection 70 and projection 36 here from considering as the abbreviation sector to which the width of face by the side of a periphery is larger than the difference which this difference produces in the difference in a radius location more widely than the width of face by the side of inner circumference Projections 36 and 70 generate the force which forces on the peripheral face of an output shaft 7 the lock members 50a and 50b which are all rollers-like, and do not cause the loss of the force by the lock members 50a and 50b touching the inner skin of the ring object 51. While forming the ring object 51 with non-magnetic material, as a magnetic suction force commits the lock members 50a and 50b and an output shaft 7 among both, you may carry out as [prevent / by the magnetic-attraction force / contact on the lock members 50a and 50b and the ring object 51].

When the hand of cut of a motor 2 is reverse, as shown in Fig. 3, since it is located in a ranging behavior field [in / respectively / time / this / projection 36 transmits power to an output shaft 7 through lock member 50a and projection 70 rotates an output shaft 7, and / in both the lock members 50a and 50b / the wedge-shaped space section] side, the shape of a lock is not made.

It is the relative rotation produced between the ring object 51 and an output shaft 7, and — if a body 1 is rotated in the direction of bolting to the circumference of the shaft of an output shaft 7 in order to perform bolting by hand control, where a motor 2 is stopped — a body 1 — getting it blocked — Although lock member 50b maintains a condition [having been located in the ranging behavior field of projection 70 approach], lock member 50a separates from projection 70 by the rolling motion accompanying the above-mentioned relative rotation, and as shown in Fig. 4, in order [in the wedge-shaped space section] to bite and to move to a lump part side, the ring object 51 and an output shaft 7 are unified. That is, the free rotation of an output shaft 7 will be in the condition of it being locked by lock member 50a and rotating with a body 1, and hand-clapping of a screw or a nut of it will become possible. And the shift to this lock condition is made automatically as mentioned above.

In order to loosen a screw and a nut, when a body 1 is turned to hard flow, as shown in Fig. 5, lock member 50b locks an output shaft 7, and makes hand return possible.

And if a motor 2 is again rotated in the condition of having been locked in this way In order to return the lock members 50a and

50b which the direction of projection 70 approached the lock members 50a and 50b by rotation of an output shaft 7, bit for the lock, and were in the lump location to the ranging behavior field in the wedge-shaped space section Or in order to put back the lock members 50a and 50b which the projection 36 in a carrier 34 bites and are in a lump location to the ranging behavior field side of the wedge-shaped space section, discharge of a lock is made automatically. Projection 36 also serves as a release member and can obtain the cost cut by reduction of the number of components while it is a power transfer member.

Other examples are shown in Figs. 7 - 10. This differs from what was shown in the above-mentioned example in that the clutch for adjustment of bolting torque is incorporated, although the structure for automatically locking and the Ohtori lease is the same.

That is, while rotation of an internal gear 33 is enabled here at the circumference of a shaft, the toothing-like clutch side 37 is established in the front end side of Intal Geer's 33 shaft orientations. And the hole 62 of shaft orientations is formed in a gear case 6, and the shot 74 which engages with the above-mentioned clutch side 37 is arranged in this hole 62. Moreover, the clutch plate 77, and the clutch spring 76 and the thrust plate 75 are arranged in the periphery of the front end side of a gear case 6, and the clutch plate 77 is engaging with the stair-like projection 80 formed in the inside of the clutch handle 78 arranged by the point of a body 1 free [rotation]. 79 in drawing is the attachment plate of the clutch handle 78.

The above-mentioned clutch spring 76 pressed the shot 74 through the thrust plate 75, carried out the load of the spring load to the engagement section of a shot 74 and the clutch side 37, and has stopped rotation of an internal gear 33. Since the engagement condition of an internal gear 33 and a shot 74 is maintained and rotation of an internal gear 33 is stopped when load torque required to rotate a screw and a nut is small, rotation of a motor 2 is slowed down like the case of said example, and is told to an output-shaft 7 side. However, if load torque becomes large rather than the setting torque by the above-mentioned spring load, rotation is begun an internal gear 33 resisting the clutch spring 76, and pushing back a shot 74 in respect of [37] a clutch, and since the power transfer by the side of an output shaft 7 will be intercepted by the slip of this internal gear 33, the bolting torque of a screw or a nut will be restricted to setting torque.

If the clutch handle 78 is rotated, in order that the clutch plate 77 and engagement location where the stair-like projection 80 of clutch handle 78 inside and rotation of the circumference of a shaft are stopped change, a clutch plate 77 may move to shaft orientations and the amount of compression of the clutch spring 76 may change, the above-mentioned setting torque can be adjusted.

Although it is in the condition that the lock was canceled as well as the condition which showed in Figs. 2 or 3 when it binds tight in here because an internal gear 33 begins a slip as mentioned above, and a limit of torque is made If body 1 itself is turned in the direction of thread fastening as [this], i.e., with the condition of having made the motor 2 turning on, as shown in Fig. 9 by rotation of a body 1, i.e., rotation of the ring object 51 Till then, it is free, and since lock member 50a which was in the ranging behavior field of the wedge-shaped space section bites, it moves to a lump location and an output shaft 7 is locked, it can shift to a hand-clapping activity as it is.

And if a body 1 is turned to hard flow, while being in the condition that the lock by lock member 50a was canceled, as [show / in Fig. 10] succeedingly with the condition of having made the motor 2 turning on Although lock member 50b shifts to a lock location at this time properly speaking Since the projection 36 of a carrier 34 is pushing lock member 50b on the projection 70 side by counteraction of a slip of an internal gear 33 at this time as the drawing Nakaya mark shows, it does not shift to a lock condition, and the automatically locking about this inverse rotation does not work. For this reason, hand-clapping with the condition of having operated the switch handle 11 and having operated the motor 2 can be performed as ratchet bolting like a ratchet driver or a ratchet wrench.

Other examples are shown in Figs. 11 thru/or 13. This equips with the plate 80 which consists of the rigid body of two sheets, and the plate 81 which consists of an elastic body of one sheet, and forms projection 70 on these plates 80 and 81 two or more sheets equipped with the hole which fits into this variant cross-section section, and here while it prepares the variant cross-section section in the back end section of an output shaft 7. The outer diameter except the overall diameter of the plate 81 which consists of an elastic body especially here is made somewhat larger than the plate 80 which consists of the rigid body of two sheets which has sandwiched this. As the plate 81 with which the lock members 50a and 50b consist of an elastic body is contacted, it enables it to obtain a positive lock.

Clearance c is formed between the variant cross-section section of an output shaft 7, and the fitting hole 84 in the plate 83 equipped with the projection 70, and you may enable it to obtain a positive lock using shakiness by this clearance c, as shown in Fig. 14. In this case, while stopping needing precision for pin center, large doubling of a sliding bearing 61 and the ring object 51 so much, assembly nature also improves.

Another example is shown in Figs. 15 - 17. While this makes the end of the shaft 35 in a carrier 34 project from the end face of a carrier 34 to an output-shaft 7 side, the end of the lock members 50a and 50b is made to project to a carrier 34 side rather than the end face of an output shaft 7, and it is made for the contact to both the lock members 50a and 50b of the shaft 35 located among a pair of lock members 50a and 50b in a hand of cut to be attained.

In this case, even if grease adhered to the lock members 50a and 50b currently formed in the shape of a roller and the lock members 50a and 50b have adhered to the both-sides side of projection 70 on the viscosity of grease When performing hand fastening by hand control by turning a body 1 Since the shaft 35 in the carrier 34 which turns to an output shaft 7 with a body 1 pulls away from projection 70 by pushing this in contact with lock member 50a as shown in Fig. 16 When the thing in the wedge-shaped space section which it bites and is moved to a lump location is not barred, a lock is made certainly and a body 1 is turned [and] to hard flow, lock member 50a Since a shaft 35 pushes lock member 50b and pulls away from projection 70 as shown in Fig. 17, the lock of the output shaft 7 also according [this time] to lock member 50b is made certainly.

Even if the grease with which the part of a planet device is filled up has adhered to the lock members 50a and 50b It is the reason that whose the situation where the lock members 50a and 50b will become having adhered to as at the projection 70, and the lock function of an output shaft 7 will be spoiled is caused it is lost. Conversely, it is also possible to arrange grease on the arrangement section of the lock members 50a and 50b, and to aim at reduction of a sound.

In addition, although the shaft 35 which is supporting the planet gear 32 here is used, heights are separately prepared in the end face of a carrier 34, and you may make it these heights contact the lock members 50a and 50b.

* NOTICES *

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

The longitudinal-section side of this invention 1 example and Figs. 2 - 5 of Fig. 1 are X-X-ray sectional views in the 1st Fig. The sectional view showing [2] the release condition at the time of normal rotation rotation, the sectional view showing [3] the release condition at the time of inversion rotation, The sectional view showing [4] the lock condition at the time of hand-clapping, the sectional view showing [5] the lock condition at the time of hand return, The side elevation of the same as the above [Fig. / 6], the side elevation of the example of others [Fig. / 7], drawing of longitudinal section of the same as the above [Fig. / 8], The cross-sectional view showing actuation of the same as the above [Figs. / 9 and 10], and Fig. 11 The decomposition perspective view of other examples, The end view of the same as the above [Fig. / 12], the fracture side elevation having shown [13] the Y-Y line cross section in the 12th Fig. by fracture, The another decomposition perspective view of an example and end view, drawing of longitudinal section of the example of others [Fig. / 15], and Figs. 16 and 17 are Z-Z line sectional views in the 15th Fig. , in 7, a lock member and 51 show a ring object and, as for an output shaft and 36, 70 shows a projection for Fig. 14 (a) and (b), as for a projection, and 50a and 50b.

[Translation done.]